was given, has made a very thorough report. Indeed, he reviewed the whole subject of the fissures and convolutions of the dog's brain before giving his observations in this particular case. His main conclusions are perhaps best indicated by a figure showing the extent of the lesion. This is traced on a schematic outline representation of the right hemisphere seen from the side.

In some places doubt as to the exact extent of the lesion rose from the obliteration of some of the fissures, and a possible dragging of the brain during cicatrization. The region enclosed within the dotted line in the accompanying figure leaves out all the doubtful points, and includes the part only which is certainly known to be covered by the lesion.

In order plainly to indicate the significance of this injury, some areas localized for the dog's brain by Ferrier have been inserted in the figure in positions which are approximately correct. The number of these areas involved, as can be seen at a glance, is very large.

The left brain of the dog was examined by Dr. Klein. Without going into the details of his report, it may be stated that the extent of the lesion was rather less than that on the right side. The destruction of the gray matter did not extend quite so far forwards, nor so far towards the base, but it was still extensive enough to include some two-thirds of the areas which were embraced by the lesion on the opposite side.

If, then, the theory of localization were correct, we should have expected to find this dog largely paralyzed on both sides of his body, and blind in both eyes. That this was not the case, the actions of the animal plainly showed. There was some degeneration found in the deeper parts of the brain, but it was apparently of little importance.

The brain of the monkey was examined by Professor Schaefer. The lesion was found quite strictly confined to the motor zone. It thus covered an oval region, occupying about the middle third of the brain, and bisected transversely by the fissure of Rolando, the ends of which extend beyond the oval on both sides. Beneath this, in the medullary centre, was a secondary lesion having about the same extent. The basal ganglia were not involved. But the very important fact was developed, that the pyramidal tract connected with the left side of the brain had undergone Wallerian degeneration through its whole extent, while there was also found an unexplained tract of degeneration in the left lateral column of the cervical cord. These deep lesions being discovered, it became at once impossible to decide whether the effects observed in the monkey were due to a removal of a certain portion of the cortex or not; so that it cannot be considered that in this case the monkey presented by Ferrier furnishes any evidence in favor of localization. From the dog, on the other hand, which was exhibited by Goltz, the conclusion is warranted, that large portions of the cortex can be removed without producing any of those effects which would be expected if the theory of localization were true; and at the same time there is some reason to believe that the removal of portions of the cortex diminishes general intelligence.

We have discussed but two experiments, and they in themselves are not sufficient ground for any generalization; yet the position in the scientific world, of all concerned, is such as to render these particular observations of more than usual importance in the history of this interesting question, and hence worth some passing attention.

HENRY H. DONALDSON.

THE WINTER OF 1879-80 IN EUROPE.

THE meteorological conditions which characterized this phenomenally cold winter have been carefully studied by M. Teisserenc de Bort. There are but few as severe winters in a century, while the month of December was the coldest on record at Paris. This exceptional cold was due to, 1°, the position of the maximum pressure; 2°, the clearness of the sky; 3°, the presence of snow upon the ground; 4°, the calm which prevailed. These conditions were united for twenty-seven consecutive days. Proceeding from the characteristics of this particular season, the author discusses the subject of the persistence of areas of high and low pressure in certain localities, and the resulting weather phenomena. These 'centres of atmospheric action' destroy the parallelism of isobars and isotherms with the equator, and control the prevailing winds. Thus, an area of high pressure generally prevails in Siberia in winter, and a similar area at about 35° north latitude in the Atlantic, near Madeira. The displacement of these maxima produces modifications in the weather of the whole of Europe, causing these abnormal seasons. Three types of cold weather may be recognized: 1°, that characterized by the displacement of the Asiatic maximum towards Europe, in which the weather is dry and quite cold; 2°, that characterized by the removal of the Madeira maximum towards France and Europe, with low areas in Tobolsk and near the Azores, in which cold and calm weather prevail; 3°, that characterized by the displacement of the Madeira maximum northward, with relatively low pressures over central Europe and the Mediterranean, and giving rise to cold with dampness and snowfall.

Similarly, two types of mild weather may be noted: 1°, that characterized by low pressures in northern Europe, with the displacement of the Madeira high area towards Spain and the Mediterranean; 2°, that characterized by a general spreading of high pressure eastward to its maximum in Russia. These types are hardly distinct enough to be classed separately: both are accompanied by south-west or west winds, bringing warm and moist air from the ocean. While the fact of the controlling influence of barometric areas is fully recognized, it is not so easy to account for the displacements which are observed. The author supposes that these are due to changes in the thermic condition of different regions of the globe, but does not attempt to further investigate this subject. If it were possible to foretell the barometric conditions of

coming months, the problem of forecasting the character of a season would be capable of solution.

W. U.

OLIVINE ROCKS OF NORTH CAROLINA.

MUCH interest was attracted a number of years ago to the olivine rocks of North Carolina by the excellent paper of Dr. Genth, on 'Corundum and its alterations.' These rocks are also well known practically from their association with the mica and corundum mines of that state: hence any thing tending to elucidate the origin and history of these immense masses of olivine is of value. There has been recently published, in the Proceedings of the Boston society of natural history, a paper by Dr. Alexis A. Julien on these olivine rocks, which is of great value, even if some exceptions may be taken to his conclusions. The particular variety of olivine rock in North Carolina is designated as dunite; it having been named from Mount Dun in New Zealand, from which locality rock of this character was first described. In North Carolina the rock is found in oval or lenticular masses in a hornblendic gneiss; and a 'marked slaty lamination' is looked upon by Dr. Julien as stratification which dips at a steep angle. His reasons for regarding this banded structure as bedding-planes are, that, on microscopic study of thin slices, there is seen an alternation of coarser and finer irregular grains. Again: grains of chromic iron are found not only dispersed throughout the rock-mass, but also in thin bands alternating with the olivine bands. He found, however, a sharp break between the lamination of the olivine rock and the foliation of the hornblendic gneiss surrounding it. Again: when there has not been formed in the rock some material, of later date than the time the rock came into place, which serves as a cement to hold the olivine grains together, the rock is pulverulent and friable, like a loosely consolidated sand.

From the above, Dr. Julien draws the conclusion that this dunite is neither of chemical nor of eruptive origin, but rather an accumulation of *débris* from some older olivine rock of eruptive origin; that is, it is an olivine sandstone. The chief defect in Dr. Julien's reasoning is, that all the evidence which he gives in support of this view could exist equally well if the rock had some entirely different origin. In order to prove that any thing must have been formed in any particular way, we ought to seek for certain characters in it which could have been produced in that way alone.

Messrs. W. C. Kerr and C. D. Smith, who have spent much time in studying this olivine rock in the field, declare in favor of the eruptive origin of it; but they have published little or none of the evidence upon which their conclusion rests, and therefore one cannot judge as to its correctness. Every rock carries within itself, or in its relations to others, the story of its origin and subsequent history with more or less completeness. The correct reading of that story depends upon our skill and knowledge. If a rock is deposited in the hollows of another as a beach formation, it is easy to see that the effect it produces upon the boundary-rock is different from its action upon them as a lava-flow or an intrusive mass. So the last two cases present different relations, according to their origin, to the surrounding rocks. As a rule, it can hardly be considered safe to positively declare what the origin of an old crystalline rock is, until these relations have been carefully ascertained; and in this direction Dr. Julien's work is defective. The present writer's microscopic study of the North Carolina dunite showed him that the rock he was studying, even when destitute of some cementing-material, was not friable and pulverulent, while the sections to his mind presented characters belonging to eruptive rocks only. The olivine grains are separated by fine fissures, but every irregularity in the outline of one is matched by a corresponding irregularity in the adjacent bounding-grains. If these grains had been water or wind worn olivine sand, no such matching of the parts would have been possible. This any one can readily see for himself if he will examine any conglomerate, and observe the amount of interstitial material it takes to hold together and fit the pebbles to one another. Then let him remember that a sandstone is a conglomerate on a small scale, and, under the microscope, a conglomerate to the eye as much as the other is to the unaided vision. The olivine rock now under consideration has absolutely no interstitial spaces and no binding-material, but the grains are fissured and separated the same as the adjacent portions are separated in cracked and fissured glass. From this the conclusion naturally follows, that such structure indicates that these olivine grains were formed by the cracking of an olivine mass during the process of solidification, crystallization, and cooling; that is, from an eruptive mass.

Further, individuals of olivine are seen in polarized light to be made up of a number of distinct grains, as much separated by fissures from one another as the distinct individual grains are elsewhere in the section. This is a natural and common occurrence in an eruptive rock, but in a sedimentary one the parts ought to be scattered. Many of these individuals, too, are long, wedge-shaped masses with sharply pointed ends. If they had been water or wind worn grains they ought to have had these sharp edges worn, rounded, and broken. These long, lenticular, fissured individuals are also arranged at every angle to one another, when, if the rock were sedimentary, they ought to lie nearly parallel, and on their sides.

The alterations of the dunite described by Dr. Julien are important and interesting because they give rise to veins and other rocks. The corundum in these veins is looked upon as a secondary product, and not, as Dr. Genth held, the primary material from which many rocks originated. The change of the olivine rock to different rocks leads to the production of chalcedonic or cherty forms, hornblendic schists, talc schists, serpentine, etc. The change to serpentine comprises every variation, "from that in which the serpentine is diffused among the olivine